



CERTIFICATION



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Technical Evaluation Report

TER 1601-06

NFPA 285 Tested Wall Assemblies
Using Kingspan Kooltherm® Insulation
Boards in Exterior Walls of Buildings of
Type I-IV Construction

Kingspan Insulation LLC

Product:

**Kingspan Kooltherm® Insulation
Boards**

Issue Date:

April 5, 2017

Revision Date:

September 4, 2019

Subject to Renewal:

April 1, 2020

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Technical Evaluation Report (TER)

NFPA 285 Tested Wall Assemblies Using
Kingspan Kooltherm® Insulation Boards
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TER No. 1601-06

Kingspan Insulation LLC

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Issue Date: April 5, 2017
Updated: September 4, 2019
Subject to Renewal: April 1, 2020

DIVISION: 07 00 00 – THERMAL AND MOISTURE PROTECTION

Section: 07 21 00 – Thermal Insulation

Section: 07 24 00 – Exterior Insulation and Finish Systems

Section: 07 27 00 – Air Barriers

1. Products Evaluated:

- 1.1. Kingspan Insulation LLC – Kingspan Kooltherm® Insulation Boards
 - 1.1.1. K8 Cavity Board
 - 1.1.2. K10 FM Soffit Board
 - 1.1.3. K12 Framing Board
 - 1.1.4. K15 Rainscreen Board
 - 1.1.5. K20 Concrete Sandwich Board
- 1.2. For the most recent version of this Technical Evaluation Report (TER), visit drjengineering.org. For more detailed state professional engineering and code compliance legal requirements and references, visit drjengineering.org/statelaw. DrJ is fully compliant with all state professional engineering and code compliance laws.
- 1.3. This TER can be used to obtain product approval in any country that is an IAF MLA Signatory (all countries found [here](#)) and covered by an [IAF MLA Evaluation](#) per the [Purpose of the MLA](#) (as an example, see [letter to ANSI](#) from the Standards Council of Canada). Manufacturers can go to jurisdictions in the U.S., Canada and other [IAF MLA Signatory Countries](#) and have their products readily approved by authorities having jurisdiction using [DrJ's ANSI accreditation](#).
- 1.4. Building code regulations require that evaluation reports are provided by an approved agency meeting specific requirements, such as those found in [IBC Section 1703](#). Any agency accredited in accordance with ANSI ISO/IEC 17065 meets this requirement within ANSI's scope of accreditation. For a list of accredited agencies, visit ANSI's [website](#). For more information, see [drjcertification.org](#).
- 1.5. Requiring an evaluation report from a specific private company (i.e. ICC-ES, IAPMO, CCMC, DrJ, etc.) can be viewed as discriminatory and is a violation of international, federal, state, provincial and local anti-trust and free trade regulations.
- 1.6. DrJ's code compliance work:
 - 1.6.1. Conforms to code language adopted into law by individual states and any relevant consensus based standard such as an ANSI or ASTM standard.
 - 1.6.2. Complies with accepted engineering practice, all professional engineering laws and by providing an engineer's seal DrJ takes professional responsibility for its specified scope of work.

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2. Applicable Codes and Standards:¹

- 2.1. 2012, 2015 and 2018 International Building Code (IBC)
- 2.2. 2012, 2015 and 2018 International Energy Conservation Code (IECC)
- 2.3. ANSI/AWC NDS – National Design Specification for Wood Construction
- 2.4. ASTM C209 – Standard Test Methods for Cellulosic Fiber Insulating Board
- 2.5. ASTM D1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics
- 2.6. ASTM D1622 – Standard Test Method for Apparent Density of Rigid Cellular Plastics
- 2.7. ASTM D1623 – Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
- 2.8. ASTM D2126 – Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging
- 2.9. ASTM D6226 – Standard Test Method for Open Cell Content of Rigid Cellular Plastics
- 2.10. ASTM E84/UL 723 – Standard Test Method for Surface Burning Characteristics of Building Materials
- 2.11. ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials
- 2.12. ASTM E136 – Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C
- 2.13. ASTM E2178 – Standard Test Method for Air Permeance of Building Materials
- 2.14. NFPA 285 – Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

3. Performance Evaluation:

- 3.1. Kingspan Kooltherm® Insulation Board products were evaluated to determine:
 - 3.1.1. Material properties in accordance with ASTM C209.
 - 3.1.2. Use as an air barrier material in accordance with [IECC Section C402.5.1.1](#).
 - 3.1.3. Performance for use in buildings of Type I-IV construction in accordance with [IBC Section 2603.5](#).
 - 3.1.3.1. Performance in accordance with ASTM E84/UL 723 for flame spread and smoke development ratings in accordance with [IBC Section 2603.3](#) and [2603.5.4](#).
 - 3.1.3.2. Performance with regard to the potential heat generated by the foam plastic insulated sheathing (FPIS) in accordance with [IBC Section 2603.5.3](#).
 - 3.1.3.3. Performance with regard to vertical and lateral fire propagation in accordance with [IBC Section 2603.5.5](#).
 - 3.1.3.4. Performance with regard to ignition in accordance with [IBC Section 2603.5.7](#).
 - 3.1.3.5. Use as part of an NFPA 285 wall assembly in accordance with [IBC Section 2603.5.5](#).
- 3.2. Any code compliance issues not specifically addressed in this section are outside the scope of this evaluation.

¹ Unless otherwise noted, all references in this code compliant technical evaluation report (TER) are from the 2018 version of the codes and the standards referenced therein, including, but not limited to, ASCE 7, SDPWS and WFCM. This product also complies with the 2000-2012 and 2015 versions of the IBC and IRC and the standards referenced therein. As required by law, where this TER is not approved, the building official shall respond in writing, stating the reasons this TER was not approved. For variations in state and local codes, if any see [Section 8](#).

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4. Product Description and Materials:



Figure 1: Kooltherm® Insulation Board

4.1. Kingspan Kooltherm® Insulation Board is:

- 4.1.1. A proprietary thermoset closed cell phenolic thermal insulation made from rigid cellular phenol resin.
- 4.1.2. Used for non-structural thermal insulation in ceiling, wall and floor assemblies in all types of construction.
- 4.1.3. Available with foil, foil-glass and glass facers.

4.1.3.1. Material Availability

- 4.1.3.1.1. Thickness: ¾" (20 mm) through 4 ¾" (120 mm)
- 4.1.3.1.2. Standard product width: 48" (1,219 mm)

Product Name	Facers	Application	Thickness (in.)	
			Thinnest	Thickest
K8	Reinforced Foil Facers Both Sides	Brick with Block Wall (16" pre-cut)	20 mm	120 mm
K12		Wood or Steel Stud Framed Wall		
K15		Rainscreen		
K10	Reinforced Foil on One Side, Glass Facer on Other	Soffit and Exposed Applications (Not Below Grade)	25 mm	120 mm
K20	Glass Facer on Both Sides	Precast/Tilt-up Concrete	20 mm	120 mm

Table 1: Kingspan Kooltherm® Products

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5. Applications:

5.1. General

- 5.1.1. Kingspan Kooltherm® Insulation Board is a rigid thermoset closed cell phenolic thermal insulation complying with [IBC Section 2603](#).
- 5.1.2. Kingspan Kooltherm® Insulation Board is used in buildings of Type I through IV construction in accordance with [IBC Section 2603.5](#).
- 5.1.3. Kingspan Kooltherm® Insulation Board is used in buildings of Type V construction in accordance with [IBC Section 2603.4.1.4](#).
- 5.1.4. Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience and technical judgment.

5.2. Permeance

- 5.2.1. Kingspan Kooltherm® Insulation Boards have a permeance rating of <1. Per [IBC Section 1404.3.2](#), only Class III vapor retarders shall be used on the interior side of walls framed with insulation boards with <1 perm installed on the exterior side of the framed wall. Water vapor permeance of Kingspan Kooltherm® is indicated in [Table 2](#).

Test Method	Water Vapor Permeance (grains/h*ft ² *in Hg) ¹		
	Foil Facers (K8, K12 and K15)	Glass Facers (K10)	Foil-Glass Facers (K20)
ASTM E96 A (Desiccant Method)	0.51	0.48	0.79
1. Results for 1" thickness board			

Table 2: Kooltherm Vapor Permeance

5.3. Air Barrier

- 5.3.1. Kingspan Kooltherm® Insulation Board is an air barrier material and meets the requirements of [IECC Section C402.5.1.2.1](#) for use as part of an air barrier assembly when installed in accordance with the manufacturer's installation instructions and this TER and with all seams, including the top and bottom edges, taped.

5.4. Surface Burn Characteristics

Product Name	Flame Spread Index	Smoke Developed Index
Kingspan Kooltherm® Insulation	<25	<450
1. Tested in accordance with UL 723 (ASTM E84) . Flame spread and smoke-developed indexes are shown for comparison purposes only and are not intended to represent the performance under actual fire conditions.		

Table 3: Fire Performance of Insulation Boards

5.5. Ignition

- 5.5.1. Kingspan Kooltherm® Insulation Boards were evaluated to assess performance with regard to ignition in accordance with [IBC Section 2603.5.7](#).
 - 5.5.1.1. Kingspan Kooltherm® Insulation Boards comply with this section when the exterior side of the sheathing is protected with one of the following materials:
 - 5.5.1.1.1. A thermal barrier complying with [IBC Section 2603.4](#).
 - 5.5.1.1.2. A minimum 1" (25 mm) thickness of concrete or masonry.
 - 5.5.1.1.3. Glass-fiber-reinforced concrete panels of a minimum thickness of 3/8" (9.5 mm).

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- 5.5.1.1.4. Metal-faced panels having a minimum 0.019"-thick (0.48 mm) aluminum or 0.016"-thick (0.41 mm) corrosion-resistant steel outer facings.
- 5.5.1.1.5. A minimum 7/8" (22.2 mm) thickness of stucco complying with [IBC Section 2510](#).
- 5.5.1.1.6. A minimum 1/4" (6.4 mm) thickness fiber-cement lap, panel or shingle siding complying with [IBC Section 1404.16](#).

5.6. Vertical and Lateral Fire Propagation

- 5.6.1. Kingspan Kooltherm® K15 & K5 Insulation Boards were tested to assess their performance with regard to vertical and lateral fire propagation in accordance with *NFPA 285* and [IBC Section 2603.5.5](#).
 - 5.6.1.1. Engineering analysis also was conducted to assess substitution of other products within the approved wall assemblies.
 - 5.6.1.2. The wall assemblies listed in [Table 4](#) and [Table 5](#) are approved for use in buildings of Type I-IV construction.
 - 5.6.1.3. The materials listed in [Table 6](#) are approved for use as WRBs in buildings of Type I-IV construction.

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NFPA 285 Approved Wall Assemblies Containing Maximum 4¾-inch Thick Kooltherm® Insulation¹	
Wall Component	Materials
Base Wall System Use 1, 2 or 3	<ol style="list-style-type: none"> 1. Cast concrete Wall 2. Concrete Masonry Wall 3. 1 layer 5/8"-thick Type X gypsum wallboard on interior installed over steel studs: minimum 3⁵/₈" depth, minimum 20-gauge, spaced at a maximum of 24" o.c. with lateral bracing every 4' vertically.
Floorline Firestopping	<ol style="list-style-type: none"> 1. 4 lb./cu ft. mineral wool in each stud cavity at each floor line, attached with Z-clips or equivalent
Cavity Insulation Use either 1, 2 or 3	<ol style="list-style-type: none"> 1. None 2. Fiberglass batt or mineral wool insulation (faced or unfaced) 3. Any noncombustible insulation (faced or unfaced)
Exterior Gypsum Sheathing Use either 1 or 2	<ol style="list-style-type: none"> 1. None; when base wall systems #1 or #2 are used, sheathing is optional 2. Minimum 5/8"-thick, Type X, exterior type gypsum sheathing
Weather-Resistive Barrier Applied Over Gypsum Sheathing Use either 1 or 2	<ol style="list-style-type: none"> 1. None 2. Any weather-resistive barrier materials as indicated in Table 6.
Exterior Insulation	Kingspan Kooltherm® K15, K8, K10, K12 or K20 insulation – minimum 1" (25 mm) thick to a maximum of 4¾" (120 mm) thick. Standard silver aluminum, black coated aluminum, white coted aluminum, or glass tissue facers are all acceptable facing materials.
Sealing of exterior insulation	Optional; all exterior insulation joints and veneer tie penetrations sealed with acrylic, asphalt or butyl-based sealing tape – max. 4-inch width
Exterior Veneer Use any of these options	<ol style="list-style-type: none"> 1. Brick <ul style="list-style-type: none"> • Standard nominal 4"-thick, clay brick • Brick veneer anchors – standard types – installed maximum 24" o.c. vertically on each stud • Maximum 2" air gap between exterior insulation and brick 2. Concrete <ul style="list-style-type: none"> • Minimum 2" thick • Maximum 2" air gap between exterior insulation and concrete. • Any standard non-open joint technique may be used. 3. CMU-concrete Masonry Units <ul style="list-style-type: none"> • Minimum 4" thick • Maximum 2" air gap between exterior insulation and CMU 4. Stone Veneer <ul style="list-style-type: none"> • Minimum 2"-thick limestone or natural stone veneer • Minimum 1½"-thick cast artificial stone veneer • Any standard non-open joint technique may be used (such as shiplap, etc.) 5. Stucco <ul style="list-style-type: none"> • Minimum ¾"-thick 2- or 3-coat stucco installed over lath
Flashing of window, door and other exterior wall penetrations	As an option, flash window, door and other exterior penetrations with limited amounts of acrylic, asphalt or butyl-based sealing tape, max. 12-inch width. As an option, Kooltherm® Cavity Closure can be used to close wall cavities at openings.
For More information regarding window detailing for NFPA 285 assemblies, please contact the manufacturer.	

Table 4: Approved NFPA 285 Wall Assemblies Containing Maximum 4¾-inch Thick Kooltherm® Insulation

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NFPA 285 Approved Wall Assemblies Containing Maximum 3-inch Thick Kooltherm® Insulation ¹	
Wall Component	Materials
Base Wall System Use 1, 2 or 3	1. Cast concrete Wall 2. Concrete Masonry Wall 3. 1 layer 5/8"-thick Type X gypsum wallboard on interior installed over steel studs: minimum 3 ⁵ / ₈ " depth, minimum 20-gauge, spaced at a maximum of 24" o.c. with lateral bracing every 4' vertically.
Floorline Firestopping	1. 4 lb./cu ft. mineral wool in each stud cavity at each floor line, attached with Z-clips or equivalent
Cavity Insulation Use either 1, 2 or 3	1. None 2. Fiberglass batt or mineral wool insulation (faced or unfaced) 3. Any noncombustible insulation (faced or unfaced)
Exterior Gypsum Sheathing Use either 1 or 2	1. None (only allowed when base wall systems #1 or #2 are used) 2. 1/2" or 5/8"-thick, Type X, exterior type gypsum sheathing
Weather-Resistive Barrier Applied Over Gypsum Sheathing Use either 1 or 2	1. None 2. Any weather-resistive barrier materials as indicated in Table 6 .
Exterior Insulation	Kingspan Kooltherm® K15, K8, K10, K12 or K20 insulation – minimum 1" (25 mm) thick to a maximum of 3" (75 mm) thick. Standard silver aluminum, black coated aluminum, white coted aluminum, or glass tissue facers are all acceptable facing materials.
Sealing of exterior insulation	Optional; all exterior insulation joints and veneer tie penetrations sealed with acrylic, asphalt or butyl-based sealing tape – max. 4-inch width
Exterior Veneer Use any of these options	1. MCM Panel System <ul style="list-style-type: none"> • Any metal composite material system that has been successfully tested by the panel manufacturer via the NFPA 285 test method. • Acceptable NFPA 285 testing shall consist of successful NFPA 285 test results on wall assembly incorporating a comparable thickness of combustible foam insulation behind the MCM. • MCM panels shall be maximum 4-mm thick 2. Steel, Aluminum or Copper Metal Exterior Wall Cladding <ul style="list-style-type: none"> • Aluminum cladding shall be minimum 0.080-inch thick; • Steel cladding shall be minimum 0.0149-inch thick; Copper cladding shall be minimum 0.0216-inch thick. • Any standard installation technique may be used. • Also acceptable to install cladding using Knight Wall Rainscreen Attachment System. 3. Fiber-Cement Siding (Noncombustible) <ul style="list-style-type: none"> • Minimum 1/4-inch thick. • Any standard installation technique with noncombustible furring can be used. • A maximum 1-1/2-inch air gap allowed behind the fiber-cement siding. 4. Swisspearl Carat Panels <ul style="list-style-type: none"> • Minimum 0.315-inch (8 mm) thick with closed or open joints (maximum 1/2 inch joints when open). • Any standard installation technique using noncombustible furring can be used. • A maximum 1 1/2-inch air gap allowed behind panels. 5. Brick <ul style="list-style-type: none"> • Standard nominal 4"-thick, clay brick • Brick veneer anchors – standard types – installed maximum 24" o.c. vertically on each stud • Maximum 2" air gap between exterior insulation and brick 6. Concrete <ul style="list-style-type: none"> • Minimum 2" thick • Maximum 2" air gap between exterior insulation and concrete. • Any standard non-open joint technique may be used. 7. CMU-concrete Masonry Units <ul style="list-style-type: none"> • Minimum 4" thick

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	<ul style="list-style-type: none"> • Maximum 2" air gap between exterior insulation and CMU <p>8. Stone Veneer</p> <ul style="list-style-type: none"> • Minimum 2"-thick limestone or natural stone veneer • Minimum 1½"-thick cast artificial stone veneer • Any standard non-open joint technique may be used (such as shiplap, etc.) <p>9. Stucco</p> <ul style="list-style-type: none"> • Minimum ¾"-thick • 2- or 3-coat stucco installed over lath <p>10. Terracotta Cladding</p> <ul style="list-style-type: none"> • Use any terracotta cladding system in which terracotta is minimum 1¼-inch thick. • Any standard joint installation technique such as ship-lap, etc. may be used. <p>11. EIFS</p> <ul style="list-style-type: none"> • Henkel Polybit Industries Limited Ceresit EIFS – EIFS system consisting of Ceresit-CT 85 adhesive mortar and basecoat, Ceresit-CT 16 primer, and Ceresit-CT 60 finish coat. <p>12. Thin Brick</p> <ul style="list-style-type: none"> • Minimum ¾-inch thick clay brick fully adhered with cementitious mortar (standard or polymer modified) to minimum ½-inch thick cement backer board or gypsum sheathing. • A secondary water-resistive barrier can be installed between the board/sheathing and the brick. • The secondary water-resistive barrier shall not be full-coverage asphalt or butyl-based self-adhered membranes.
<p>Flashing of window, door and other exterior wall penetrations</p>	<p>As an option, flash window, door and other exterior penetrations with limited amounts of acrylic, asphalt or butyl-based sealing tape, max. 12-inch width.</p> <p>As an option, Kooltherm® Cavity Closure can be used to close wall cavities at openings.</p>
<p>For More information regarding window detailing for NFPA 285 assemblies, please contact the manufacturer.</p>	

Table 5: Approved NFPA 285 Wall Assemblies Containing Maximum 3-inch Thick Kooltherm® Insulation

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Approved Water-Resistive Barriers Applied Over Exterior Gypsum Sheathing and Underneath Kingspan Kooltherm® Insulation ¹		
Material	For Use with Table 4	For Use with Table 5
3M™		
3M™ Self-Adhered Air and Vapor Barrier 3015	X	X
BASF		
MasterSeal AWB 660	X	X
MasterSeal AWB 660I	X	X
Carlisle		
CCW-705FR w/ Primers	X	X
Barritech™ VP	X	X
Barritech™ NP	X	X
Cosella-Dörken		
DeltaR-Foxx	X	X
DeltaR-Foxx Plus	X	X
DeltaR-Fassade S	X	X
DeltaR-Vent S/Plus	X	X
DeltaR-Maxx Plus	X	X
Dow Chemical		
WeatherMate™	X	X
WeatherMate™ Plus	X	X
Dow Corning®		
DefendAir 200	X	X
Dryvit		
BackstopR NT	X	X
DuPont		
DuPont™ TyvekR CommercialWrapR	X	X
DuPont™ TyvekR CommercialWrapR D	X	X
DuPont™ TyvekR ThermoWrap™	X	X
DuPont™ TyvekR Fluid Applied WB+ – nominal 25 wet mil thickness	X	X
Henry Company		
Air-BlocR 32MR	X	X
Air-BlocR 31MR	X	X
Air-BlocR 33MR	X	X
Blueskin VP™ 160	X	X
Air-BlocR 21 FR	X	X
Metal Clad™	X	X
FoilskinR	X	X
Hohmann & Barnard		
Enviro-Barrier™	X	X
Enviro-Barrier™ VP	X	X
Grace Construction Products		
Perm-A-BarrierR Aluminum Wall Membrane	X	X
Perm-A-BarrierR VPL	X	X
Perm-A-BarrierR VPL LT	X	X
Perm-A-BarrierR VPS	X	X
Perm-A-BarrierR NPL 10	X	X
Table Continues on Next Page		
JX Nippon ANCI, Inc.		

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Approved Water-Resistive Barriers Applied Over Exterior Gypsum Sheathing and Underneath Kingspan Kooltherm® Insulation ¹		
Material	For Use with Table 4	For Use with Table 5
JX ALTATM Commercial Wrap	X	X
JX ALTATM HP Wrap	X	X
JX ALTATM LP Wrap	X	X
Kingspan		
KingspanR GreenGuardR Max™ Building Wrap	X	X
KingspanR GreenGuardR Classic Building Wrap	X	X
KingspanR GreenGuardR C2000 Building Wrap	X	X
KingspanR GreenGuardR RaindropR 3D Building Wrap	X	X
KingspanR GreenGuardR HPW™ Building Wrap	X	X
Everbilt™ Premium Non-woven Housewrap	X	X
Momentive Performance Materials		
GE SEC2500 SilShield* AWB	X	X
GE SEC2600 SilShield* AWB	X	X
GE SEC2600-r SilShield* AWB	X	X
Polyguard Products		
Airllok FlexR applied at a maximum 40 mils WFT	X	
Airllok FlexR WG applied at a maximum 20 mils WFT	X	
Airllok FlexR VP applied at a maximum 32 mils WFT	X	
Prosoco		
CAT 5	X	
CAT 5 Rainscreen	X	
Soprema		
Sopresa Stick 1100 TI	X	
Sopraseal Stick VP	X	
Sto Corp		
Sto Gold CoatR with StoGuard Fabric	X	X
Sto Emerald CoatR with StoGuard Fabric	X	X
Sto ExtraSeal™ with StoGuard Mesh	X	X
StoGuardR VaproShield™	X	
STS, Inc.		
Wall Guardian™ FW-100A	X	X
Tremco, Inc.		
ExoAir 430	X	
VaproShield		
WallShieldR	X	X
WrapShieldR	X	X
WrapShieldR SA™	X	
RevealShield™	X	X
RevealShield SA™	X	X
W.R. Meadows		
Air-Shield™ LMP (Gray)	X	X
Air-Shield™ LMP (Black)	X	X
Air-Shield™ TMP	X	X
Air-Shield™ LSR	X	X
1. All WRBs to be installed at the indicated or recommended application rates and per the manufacturer's installation instructions.		

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Table 6: Approved *NFPA 285* WRBs

6. Installation:

- 6.1. Installation shall comply with the manufacturer's [installation instructions](#) and this TER. In the event of a conflict between the manufacturer's installation instructions and this TER, the more restrictive shall govern.
- 6.2. See [Table 4](#) and [Table 5](#) for *NFPA 285*-compliant wall assemblies using Kingspan Kooltherm® Insulation Board. See [Table 6](#) for *NFPA 285*-compliant WRBs.
- 6.3. For applications outside the scope of this TER, an engineered design is required.

7. Test and Engineering Substantiating Data:

- 7.1. Test reports and data supporting the following material properties and wall assembly performance:
 - 7.1.1. Material properties in accordance with *ASTM C209* by Intertek.
 - 7.1.2. Compressive strength properties in accordance with *ASTM D1621* by Intertek.
 - 7.1.3. Apparent core density properties in accordance with *ASTM D1622* by Intertek.
 - 7.1.4. Tensile strength in accordance with *ASTM D1622* by Intertek.
 - 7.1.5. Flame spread and smoke developed ratings in accordance with *ASTM E84/UL 723* by Underwriters Laboratories, Inc.
 - 7.1.6. Water vapor transmission and permeance properties in accordance with *ASTM E96* by Intertek.
 - 7.1.7. Air barrier material performance of Kooltherm® Insulation Boards in accordance with *ASTM E2178* by Intertek.
 - 7.1.8. Vertical and lateral flame spread in accordance with *NFPA 285* by Underwriters Laboratories, Inc.
- 7.2. Engineering analysis supporting the following material properties:
 - 7.2.1. Jensen Hughes, Analysis and Extension of *NFPA 285* Tests – Kingspan Kooltherm® K15 & K5 Insulation.
- 7.3. Manufacturer technical data sheets and installation instructions.
- 7.4. Manufacturer quality control manual and evidence of approved agency inspections.
- 7.5. Test reports and data for determining comparative equivalency for use as an alternative material in accordance with [IBC Section 104.11](#).
- 7.6. The product(s) evaluated by this TER fall within the scope of one or more of the model, state or local building codes for building construction. The testing and/or substantiating data used in this TER is limited to buildings, structures, building elements, construction materials and civil engineering related specifically to buildings.
- 7.7. The provisions of model, state or local building codes for building construction do not intend to prevent the installation of any material or to prohibit any design or method of construction. Alternatives shall use consensus standards, performance-based design methods or other engineering mechanics based means of compliance. This TER assesses compliance with defined standards, accepted engineering analysis, performance-based design methods, etc. in the context of the pertinent building code requirements.
- 7.8. Some information contained herein is the result of testing and/or data analysis by other sources, which DrJ relies on to be accurate, as it undertakes its engineering analysis.
- 7.9. DrJ has reviewed and found the data provided by other professional sources are credible. The information in this TER conforms with DrJ's procedure for acceptance of data from approved sources.
- 7.10. DrJ's responsibility for data provided by approved sources conforms with [IBC Section 1703](#) and any relevant professional engineering law.

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7.11. Where appropriate, DrJ relies on the derivation of design values, which have been codified into law through codes and standards (e.g., *IRC, WFCM, IBC, SDPWS, NDS, ACI, AISI, PS-20, PS-2*, etc.). This includes review of code provisions and any related test data that aids comparative analysis or provides support for equivalency to an intended end-use application. Where the accuracy of design values provided herein is reliant upon the published properties of commodity materials (e.g. lumber, steel, concrete, etc), DrJ relies upon grade/properties provided by the raw material supplier to be accurate and conforming to the mechanical properties defined in the relevant material standard.

8. Findings:

- 8.1. Kingspan Kooltherm® Insulation Boards are approved for use in exterior walls without a thermal barrier in accordance with [IBC Section 2603.4](#) and [2603.5.2](#).
- 8.2. Kingspan Kooltherm® Insulation Boards are approved for use in exterior walls of buildings of Type I-IV construction in accordance with [IBC Section 2603.5](#).
- 8.3. Kingspan Kooltherm® Insulation Boards are approved for use in wall assemblies meeting the requirements of *NFPA 285* testing when constructed in accordance with [Table 3](#).
- 8.4. Kingspan Kooltherm® Insulation Boards described in this TER comply with, or are a suitable alternative to, the applicable sections of the codes listed in [Section 2](#).
- 8.5. [IBC Section 104.11](#) (*IRC Section R104.11* and *IFC Section 104.9* are similar) states:

104.11 *Alternative materials, design and methods of construction and equipment.* The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code. ... Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.
- 8.6. This product has been evaluated in the context of the codes listed in [Section 2](#), and is compliant with all known state and local building codes. Where there are known variations in state or local codes that are applicable to this evaluation, they are listed here:
 - 8.6.1. No known variations
- 8.7. This TER uses professional engineering law, the building code, ANSI/ASTM consensus standards and generally accepted engineering practice as its criteria for all testing and engineering analysis. DrJ's professional engineering work falls under the jurisdiction of each state Board of Professional Engineers, when signed and sealed.

9. Conditions of Use:

- 9.1. Where required by the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the [installation instructions](#) shall be submitted at the time of permit application.
- 9.2. Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the code official for review and approval.
- 9.3. Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.
- 9.4. The products listed in this TER shall be installed in accordance with this TER and the manufacturer's installation instructions.
- 9.5. In areas where the probability of termite infestation is very heavy and the building is wood-framed construction, the product must not be placed on exterior walls located within 6" (152 mm) of the ground and shall meet the requirements of [IBC Section 2603.8](#).

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- 9.6. Kingspan Kooltherm® Insulation Boards shall be separated from the interior of the building by an approved thermal barrier except as provided for in [Section 5.5](#).
- 9.7. This product shall not be used as a nailing base for claddings.
- 9.8. The insulation boards shall not be used to resist lateral loads. Walls shall be braced by other materials in accordance with the applicable code, and the exterior wall covering shall be capable of resisting the full design wind pressure.
- 9.9. The insulation boards are manufactured in Pembroke, United Kingdom under a quality control program with quality control inspections in accordance with [IBC Section 110.3.8](#) and [110.3.9](#).
- 9.10. Design
 - 9.10.1. Building Designer Responsibility
 - 9.10.1.1. Unless the AHJ allows otherwise, the Construction Documents shall be prepared by a Building Designer (e.g., Owner, Registered Design Professional, etc.) for the Building and shall be in accordance with [IRC Section R106](#) and [IBC Section 107](#).
 - 9.10.1.2. The Construction Documents shall be accurate and reliable and shall provide the location, direction and magnitude of all applied loads and shall be in accordance with [IRC Section R301](#) and [IBC Section 1603](#).
 - 9.10.2. Construction Documents
 - 9.10.2.1. Construction Documents shall be submitted to the Building Official for approval and shall contain the plans, specifications and details needed for the Building Official to approve such documents.
- 9.11. Responsibilities
 - 9.11.1. The information contained herein is a product, material, detail, design and/or application TER evaluated in accordance with the referenced building codes, testing and/or analysis through the use of accepted engineering practice, experience and technical judgment.
 - 9.11.2. DrJ TERs provide an assessment of only those attributes specifically addressed in the Products Evaluated or Code Compliance Process Evaluated sections.
 - 9.11.3. The engineering evaluation was performed on the dates provided in this TER, within DrJ's professional scope of work.
 - 9.11.4. This product is manufactured under a third-party quality control program in accordance with [IRC Section R104.4](#) and [R109.2](#) and [IBC Section 104.4](#) and [110.4](#).
 - 9.11.5. The actual design, suitability and use of this TER, for any particular building, is the responsibility of the Owner or the Owner's authorized agent, and the TER shall be reviewed for code compliance by the Building Official.
 - 9.11.6. The use of this TER is dependent on the manufacturer's in-plant QC, the ISO/IEC 17020 third-party quality assurance program and procedures, proper installation per the manufacturer's instructions, the Building Official's inspection and any other code requirements that may apply to demonstrate and verify compliance with the applicable building code.

10. Identification:

- 10.1. The insulation boards described in this TER are identified by a label bearing the manufacturer's name, product name, TER number, and other information to confirm code compliance.
- 10.2. Additional technical information can be found at www.kingspaninsulation.us.

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11. Review Schedule:

- 11.1. This TER is subject to periodic review and revision. For the most recent version of this TER, visit drjengineering.org.
- 11.2. For information on the current status of this TER, contact [DrJ Engineering](#).



- [Mission and Professional Responsibilities](#)
- [Product Evaluation Policies](#)
- [Product Approval – Building Code, Administrative Law and P.E. Law](#)